

WHAT IS CLAIMED IS:

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1. An image recording apparatus for recording images sensed by at least two image sensing means attached to a vehicle, comprising:

first image sensing means which is arranged to have an image sensing direction agreeing with a first direction of the vehicle;

second image sensing means which is arranged at a position separated a known distance from said first image sensing means to have an image sensing direction agreeing with a second direction substantially 180° different from the first direction; and

recording means for, when the vehicle travels in the first direction, associating first image data sensed by said first image sensing means with second image data sensed by said second image sensing means a time duration later corresponding to said known distance, and recording said first and second image data.

2. The apparatus according to claim 1, wherein said first image sensing means comprises a plurality of cameras, image sensing directions of which are deployed symmetrically about the first direction.

3. The apparatus according to claim 2, wherein

straight lines on the image sensing directions of said plurality of cameras cross each other in front of said plurality of cameras.

5 4. The apparatus according to claim 1, further comprising:

 third image sensing means which is arranged at a position near said first image sensing means to have an image sensing direction agreeing with a third direction different
10 from the first direction; and

 fourth image sensing means which is arranged at a position symmetrical to the third direction about a straight line pointing in the first direction.

15 5. The apparatus according to claim 1, wherein said second image sensing means comprises a plurality of cameras, image sensing directions of which point in at least two directions symmetrical about the second direction.

20 303A2 6. An image recording apparatus for recording images sensed by at least two image sensing means attached to a vehicle, comprising:

 first image sensing means which is arranged to have an image sensing direction agreeing with a first direction of
25 the vehicle;

 a plurality of cameras which are arranged at positions

separated a known distance from said first image sensing means to have image sensing directions agreeing with a plurality of directions symmetrical about a second direction substantially 180° different from the first direction;

5 means for detecting a turn of the vehicle;

selection means for selecting the camera which points at a larger angle in a counterclockwise or clockwise direction from said plurality of cameras depending on whether the vehicle has turned clockwise or counterclockwise from
10 the first direction; and

recording means for associating first image data sensed by said first image sensing means with second image data sensed by the camera selected by said selection means a time duration later corresponding to the known distance, and
15 recording said first and second image data.

7. The apparatus according to claim 6, wherein said plurality of cameras have two cameras, and the image sensing directions of said cameras cross each other on an extending
20 line of the second direction.

8. The apparatus according to claim 6, wherein said plurality of cameras have first to third cameras, said first camera has an image sensing direction agreeing with the
25 second direction, and image sensing directions of said second and third cameras are respectively turned clockwise and

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counterclockwise to be deployed symmetrically about the
second direction, and

said selection means selects

said first camera when the vehicle travels in the first
5 direction,

said second camera when the vehicle turns
counterclockwise, and

said third camera when the vehicle turns clockwise.

10 9. The apparatus according to claim 6, further
comprising:

third image sensing means which is arranged at a
position near said first image sensing means to have an image
sensing direction agreeing with a third direction different
15 from the first direction; and

fourth image sensing means which is arranged at a
position symmetrical to the third direction about a straight
line pointing in the first direction.

20 ^{SVB} A3 10. An image database apparatus for generating a
database used for building a three-dimensional image space
from image sequences sensed by a plurality of image sensing
means attached to a vehicle after acquisition of image data,
comprising:

25 a first reader for reading data from a first image data
memory recorded by first image sensing means pointed in a

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first direction;

a second reader for reading data from a second image memory recorded by second image sensing means which is arranged at a position separated a known distance from said first image sensing means to point in a second direction substantially 180° different from the first direction;

a third reader for reading data from a third memory which records a moving position and traveling direction of the vehicle; and

means for associating image data read by said first reader, and image data at a position the known distance later of those read by said second reader with each other when traveling direction data read by said third reader indicates that the vehicle is traveling substantially straight.

11. The apparatus according to claim 10, wherein when said image sensing means includes two cameras having different directions,

said associating means associates image data read by said first reader and image data at a position the known distance later of those read by said second reader from the camera located at a counterclockwise or clockwise position with each other, when the traveling direction data read by said third reader indicates a clockwise or counterclockwise turn.

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12. An image recording method of recording images sensed by at least two image sensing means attached to a vehicle, comprising the steps of:

arranging first image sensing means to have an image
5 sensing direction agreeing with a first direction of the vehicle;

arranging second image sensing means at a position separated a known distance from said first image sensing means to have an image sensing direction agreeing with a
10 second direction substantially 180° different from the first direction; and

associating, when the vehicle travels in the first direction, first image data sensed by said first image sensing means with second image data sensed by said second
15 image sensing means a time duration later corresponding to the known distance.

13. The method according to claim 12, wherein said first image sensing means comprises a plurality of cameras,
20 image sensing directions of which are deployed symmetrically about the first direction.

14. The method according to claim 13, wherein straight
lines on the image sensing directions of said plurality of
25 cameras cross each other in front of said plurality of cameras.

15. The method according to claim 12, further comprising the steps of:

arranging third image sensing means at a position near
5 said first image sensing means to have an image sensing direction agreeing with a third direction different from the first direction; and

arranging fourth image sensing means at a position symmetrical to the third direction about a straight line
10 pointing in the first direction.

16. The method according to claim 12, wherein said second image sensing means comprises a plurality of cameras, image sensing directions of which point in at least two
15 directions symmetrical about the second direction.

SUB A7 17. An image recording method of recording images sensed by at least two image sensing means attached to a vehicle, comprising the steps of:

20 arranging first image sensing means to have an image sensing direction agreeing with a first direction of the vehicle;

arranging a plurality of cameras at positions separated a known distance from said first image sensing means to have
25 image sensing directions agreeing with a plurality of directions symmetrical about a second direction

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substantially 180° different from the first direction;

detecting a turn of the vehicle;

selecting the camera which points at a larger angle in
a counterclockwise or clockwise direction from said
5 plurality of cameras depending on whether the vehicle has
turned clockwise or counterclockwise from the first
direction; and

recording first image data sensed by said first image
sensing means and second image data sensed by the selected
10 camera at a timing a duration corresponding to the known
distance later in association with each other.

18. The method according to claim 17, wherein said
plurality of cameras have two cameras, and the image sensing
15 directions of said cameras cross each other on an extending
line of the second direction.

19. The method according to claim 17, wherein said
plurality of cameras have first to third cameras, said first
20 camera has an image sensing direction agreeing with the
second direction, and image sensing directions of said second
and third cameras are respectively turned clockwise and
counterclockwise to be deployed symmetrically about the
second direction, and

25 the selection step includes the step of selecting
said first camera when the vehicle travels in the first

direction,

said second camera when the vehicle turns
counterclockwise, and

said third camera when the vehicle turns clockwise.

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20. A recording medium of a computer program which
makes a computer execute control for recording images sensed
by first image sensing means which is arranged to have an
image sensing direction agreeing with a first direction of
10 the vehicle, and second image sensing means which is arranged
at a position separated a known distance from said first image
sensing means to have an image sensing direction agreeing
with a second direction substantially 180° different from the
first direction, said medium recording:

15 first program code means for, when the vehicle travels
in the first direction, recording first image data sensed
by said first image sensing means and second image data sensed
by said second image sensing means in association with each
other.

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21. A recording medium of a computer program which
makes a computer execute control for recording images sensed
by first image sensing means which is arranged to have an
image sensing direction agreeing with a first direction of
25 the vehicle, a plurality of cameras which are arranged at
positions separated a known distance from said first image

sensing means to have image sensing directions agreeing with a plurality of directions symmetrical about a second direction substantially 180° different from the first direction, said medium recording:

5 first program code means for detecting a turn of the vehicle;

second program code means for selecting the camera which points at a larger angle in a counterclockwise or clockwise direction from said plurality of cameras depending on whether
10 the vehicle has turned clockwise or counterclockwise from the first direction; and

third program code means for recording first image data sensed by said first image sensing means and second image data sensed by the selected camera at a timing a duration
15 corresponding to the known distance later in association with each other.

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